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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/714,680 11/16/00 BUNYAN

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EXAMINER

TARAZANO, D

ART UNIT

PAPER NUMBER

1773

DATE MAILED:

11/01/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

09/714,680

Applicant(s)

BUNYAN ET AL.

Examiner

D. Lawrence Tarazano

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 14-19 is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 1.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

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DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-5, 9, 10 are rejected under 35 U.S.C. 102(b) based upon a public use or sale of the invention. AI Technologies sold TP7609 a thermoplastic diamond filled interface film that re-melts at the operating temperature of electronic devices (Invoice dated 02/12/1993 to Fermi Labs). These materials are within the claimed thickness and melting range (Cool Pad TP7609 Data sheet). The method of application including applying pressure of more than 3 psi, so additional force is applied in the application of the film as claimed. The data sheets from TP7608 the same product line clearly teach the use of a release sheet as claimed.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 2, 3, 4, 9, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zero Stress Film Adhesives for Substrate Attach (Leung et al.), Hybrid Circuits: January 1989.

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Leung et al. teach flexible epoxy films that are used as thermal interfaces in electronic circuits. The materials comprise thermal conductive particles such as alumina (column 5, line 1), in which the epoxy materials exhibit a glassy to rubbery phase transition in the temperature range of 60-200 °C, in which the phase transition temperature is dependent on the degree of cross linking (column 3, lines 1+).

The films are heated so that they flow and pressure is applied to get good bonding (column 4, paragraph 3).

The essential differences between the structures / methods claimed in the instant application, and the disclosure of Leung et al. are: the thickness of the films; and the specific requirement that the phase transition temperature occurs between the ambient temperature and the operating temperature. However, the operating temperature overlaps with the lower end of the claimed range.

Regarding the thickness of the adhesive films, it would have been obvious to one having ordinary skill in the art to optimize the thickness of the adhesive film depending on the surface features of the two materials being combined. A thinner film would be useful in binding very flat surfaces, but a thicker film would be useful in applications in which the surfaces were not so uniform so the film would be able to fill in the uneven areas.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have used polymers which only having a low degree of cross linking for use in applications in which a low melting point polymer was desired. For example, polymer having a melting point, which overlapped the claimed range, would be easy to apply.

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5. Claims 1-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Filled Thermal interface sheets sold by AI Technologies in view of Whitfield et al. (4,299,715).

AI Technologies sold TP7609 a filled thermoplastic diamond filled interface that re-melts at the operating temperature of the electronic device (Invoice dated 02/12/1993 to Fermi Labs). These materials are within the claimed thickness and melting range (Cool Pad TP7609 Data sheet). The method of application including applying pressure of more than 3 psi, so additional force is applied in the application of the film as claimed. The data sheets from TP7608 part of the same product line clearly teach the use of a release sheet as claimed.

The essential difference between the claimed invention as those sold by AI Technologies as TP7608 and TP7609 is the specific use of an interface composition "consisting essentially of" 20-80% of a wax component and 80-20% by weight of thermally conductive filler.

Whitefield et al. teach filled waxy materials, which overlap in composition with those, claimed. The materials are molten at temperatures in the range of 50 to 60 deg. C. (column 5, lines 51), but a sold at room temperature. The materials can be applied by a variety of methods including: gaskets, brushed on in melt form, rubbed on, etc. (figures). However, they fail to teach the materials in the form of a film having a release sheet there on.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have produced the thermal interface sheets taught by AI Technologies from the materials taught by Whitefield et al. Whitefield et al. recite materials which melt in the range taught by AI Technologies, and the materials are used in the same environment. This is merely the substitution of one functionally equivalent material for another.

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It also would have been obvious to one having ordinary skill in the art at the time the invention was made to have formed the materials taught by Whitefield et al. in the form of sheet having a release layer there on, since this is an easy method of applying thermal interfaces as shown by AI Technologies. Furthermore, Whitefield et al. is non-restrictive regarding the possible methods of application.

Status of the Original Patent

6. The original patent, or an affidavit or declaration as to loss or inaccessibility of the original patent, must be received before this reissue application can be allowed. See 37 CFR 1.178.

Analysis of other prior art

7. The instant invention claims materials, which are in a solid phase at room temperature and then change to a second phase at the operating temperature. The expressed purpose of this phase change is to provide a deformable material, which provides better contact at the operating temperature of the equipment.

In the document provided by Eugene Lieberstein, he makes reference to a series of T-GON resin films from Thermagon Inc and ABLEFILM resin films.

The T-GON materials from Thermagon Inc. are "curable", meaning that such materials are thermosetting materials, (i.e. they are cross linked upon heating). They are not thermoplastic (a material which will melt if reheated). There is no reason to believe that the Thermagon materials phase change at the operating temperature as claimed. Furthermore, there is no

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indication that the melt at the operating temperature of electronic equipment that such materials go through some other form of phase change.

Mr. Lieberstein points to the way the materials produced by Thermagon are cured at an elevated temperature to show that a phase change occurs. However, this temperature is well above the operating temperature of the electronic components, which are used, and once such materials are cured, they would be non-meltable solid. These are application conditions, not normal operating conditions.

The ABLEFILM materials are also thermosetting materials. While they have an initial glass transition temperature in the range of 90°C, the materials cure around this temperature and would become irreversible solids.

It is unreasonable to believe that either of these materials operates as claimed. The materials claimed in the instant invention are for the most part "thermoplastic": (i.e. go from solid to liquid in a reversible fashion). It is also reasonable to interpret the claims to include materials that go through some other form of phase change (e.g. a solid to rubber phase change).

In contrast, a cured solid will not re-melt; thus, it does not reversibly phase change (e.g. go from solid to liquid). Unless such material go through some other form of reversible phase change in the operating temperature of the electronic component, they do not operate as claimed. Since there is no indication that the cured resins go through a phase change, there is no reason to believe that they operate as claimed.

Shore 5,061,549 teaches adhesives that are thermoplastic, but they clearly teach away from using materials, which melt at the operating temperature of the electronic component since this would cause adhesive failure. The materials are heated by external means (column 4, lines

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57+), in which the molten materials cool to form a strong bond (column 4, lines 57 to column 5, line 6).

Allowable Subject Matter

8. Claims 14-19 are allowed. The closest prior is the meltable filled thermoplastic films produced by AI Technologies; however, they are silent regarding the specific composition of materials used in their production. Furthermore, there is no obvious reason to use the claimed specific compositions, which comprise acrylic pressure sensitive adhesives and additional components since there is no guidance in what materials would be suitable.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to D. Lawrence Tarazano whose telephone number is (703)-308-2379. The examiner can normally be reached on 8:30 to 6:00 (off every other Friday).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul J Thibodeau can be reached on (703)-309-2367. The fax phone numbers for the organization where this application or proceeding is assigned are (703)-872-9310 for regular communications and (703)-872-9311 for After Final communications.

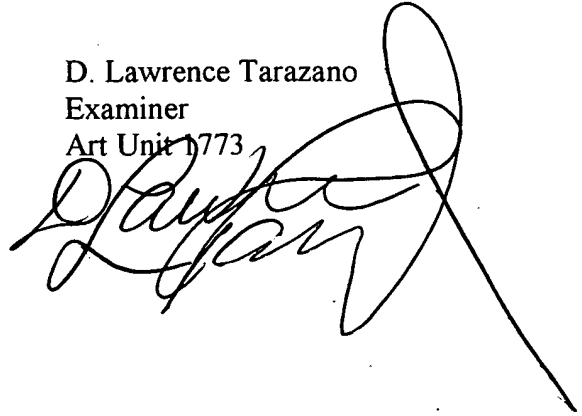
Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)-308-0661.

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dlt
October 16, 2001

D. Lawrence Tarazano
Examiner
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A handwritten signature in black ink, appearing to read 'D. Lawrence Tarazano', is written over the printed name and title. The signature is stylized with a large loop at the end.